

$$f(-n) = x f(n), r|n|+1 \quad f(n) + n f(-n) = r|n|+1 \quad f(-n) = n f(n) \cdot \frac{r|n|+1}{1+n^2}$$

$$\oplus f(n) + n f(-n) = r|n|+1$$

$$f(-n) = r|n|+1 + n f(n)$$

$$f(n) + n(r|n|+1 + n f(n)) = r|n|+1$$

$$(1+n^2) f(n) + (r|n|+1)n = r|n|+1$$

$$f(n) + f(-n) = r^2 - r n + r$$

$$n \rightarrow -n \rightarrow f(-n) = r \rightarrow f(n) = r$$

$$f(n) = x^2 - r n + r$$

$$f(n^2) = x^2 - r n^2 + r$$

$$f(n) = \frac{(r|n|+1)(1-n)}{1+n^2}$$

$$xy - y = x^2 + n + r \rightarrow x^2 + (1-y)n + (r+y) = 0 \rightarrow n = \frac{y-1 \pm \sqrt{(1-y)^2 - 4(r+y)(1)}}{2(1-y)}$$

$$\rightarrow y^2 - 2y - v = 0 \rightarrow (y-v)(y+1) = -\frac{v}{1} \rightarrow R_f = (-\infty, -1] \cup [v, +\infty)$$

$$الف) y = x^2 - 5x + 1 \rightarrow \frac{-\Delta}{2a} = \frac{-(5 \pm \sqrt{25-4(1)(1)})}{2} = \frac{-5 \pm 4}{2} \rightarrow R_f = [\frac{-5+4}{2}, +\infty)$$

$$ب) y = \sqrt{-x^2 + 6x - 5} \rightarrow \frac{-\Delta}{2a} = \frac{-(6 \pm \sqrt{36-4(1)(5)})}{2} = \frac{-6 \pm 4}{2} = -1 \rightarrow R_f = [0, 1] \rightarrow (قبلی از اینجای که زیر را بیاورد)$$

$$ج) y = \sqrt{x^2 - 5x^2 + 6x + 1} \rightarrow \mathbb{R} \rightarrow R_f = [0, +\infty)$$

$$د) y = \deg x^2 - 5x^2 + 6x + 1 \rightarrow R_f = (-\infty, +\infty)$$

$$الف) y = \frac{x^2+1}{x^2-2} \quad \mathbb{R} - \left\{ \frac{a}{c} \right\} \rightarrow \mathbb{R} - \left\{ \frac{r}{r} \right\}$$

$$ب) y = \sqrt{\frac{x^2+1}{x^2-2}} \rightarrow \mathbb{R} - \{f\} \rightarrow [0, +\infty) - \{f\}$$

$$ج) y = \frac{x^2+5}{\sqrt{x^2+3} + \frac{1}{\sqrt{x^2+3}}} \rightarrow R_f = \left[\frac{5}{2\sqrt{3}}, +\infty \right)$$

$$د) y = x^2 + \frac{1}{x^2+5} \rightarrow \left[x^2 + 5 + \frac{1}{x^2+5} \right] - 5 \rightarrow R_f = \left[\frac{1}{5}, +\infty \right)$$

$$ad \neq bc$$

$$y = \frac{x^2 + \varepsilon}{x^2 - 1} \xrightarrow{\text{division}} yx^2 - y = x^2 + \varepsilon \rightarrow yx^2 - x^2 = \varepsilon + y \rightarrow x^2(y-1) = \varepsilon + y \rightarrow x^2 = \frac{\varepsilon + y}{y-1} \rightarrow x = \pm \sqrt{\frac{\varepsilon + y}{y-1}}$$

$$+\frac{\varepsilon}{y-1} \rightarrow R_f = (-\infty, -\varepsilon] \cup (\varepsilon, +\infty)$$

$$\text{for } y = x^2 = t \rightarrow \frac{t + \varepsilon}{t - 1} \rightarrow t = \frac{y + \varepsilon}{y - 1}$$

$$t \geq 0 \rightarrow R_f = (-\infty, -\varepsilon] \cup (\varepsilon, +\infty) \quad (4)$$

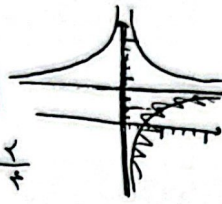
$$y = \frac{\sin x + \varepsilon}{\sin x - \varepsilon} \quad -1 \leq \sin x \leq 1$$

$$1 \rightarrow \frac{1 + \varepsilon}{1 - \varepsilon} \quad -1 \rightarrow \frac{-1 + \varepsilon}{-1 - \varepsilon} = -\frac{1 - \varepsilon}{1 + \varepsilon}$$

$$R_f = \left[-\frac{1 - \varepsilon}{1 + \varepsilon}, \frac{1 + \varepsilon}{1 - \varepsilon}\right]$$

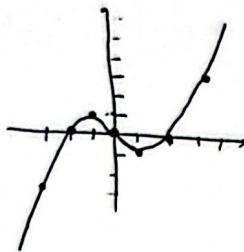
$$\text{a) } y = \left| \frac{x-1}{x} \right| \quad R_f = [0, +\infty)$$

$$y = \frac{x}{x} \quad x \neq 1 \rightarrow \frac{x}{x}$$

$$x = 0$$


$$\text{b) } y = \sqrt{\frac{x-1}{x-1}} \rightarrow \sqrt{\frac{x-1}{x-1}} = \sqrt{\frac{1}{1}} = 1$$

$$R_f = \{1\}$$



$x^2 - 1$	$x^2 - 1$
$-1 \rightarrow -1 + \varepsilon$	$1 \rightarrow -1$
$-1 \rightarrow -1 + \varepsilon$	$\varepsilon \rightarrow 0$
$-1 \rightarrow -1 + \varepsilon$	$\varepsilon \rightarrow 1$
$-1 \rightarrow -1 + \varepsilon$	$\varepsilon \rightarrow 1$

$$y = \frac{x}{|x|} = \frac{x}{x} = 1 \quad R_f = \{1\}$$

$$y = |f(m) + 1|$$

